

Days of Wine . . . and Pickles

You wouldn't normally think of wine and pickles going together, but an enterprising ARS researcher has found a way to improve quality analysis of both products.

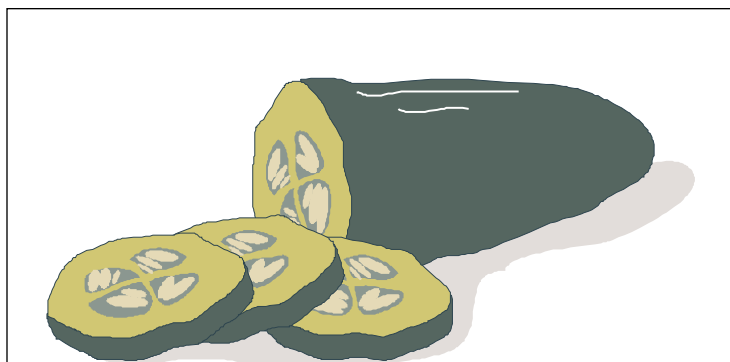
Using high-performance liquid chromatography (HPLC) is nothing new. It's been around for 30 years. But for food scientists studying fermentation—that chemical magic that turns cukes into pickles and grapes into wine—HPLC is both a helpful tool and a hassle.

The HPLC needs as little as a hundredth of a drop for analysis. But with fermented vegetables and wines, there are so many components that the instrument can't separate them all. This has meant that scientists studying these products have had to prepare and inject multiple samples.

"In pickle fermentation, there are two sugars present, as well as multiple acids and alcohols," says chemist Roger F. McFeeters, who is in the ARS Food Science Research Unit at Raleigh, North Carolina. "Wine chemists have it worse—there are even more components."

But McFeeters changed this well-known scientific instrument so the measurements could be done in 20 minutes—without multiple runs. That cuts running time in half. Better still, scientists don't have to lose several hours reconfiguring the HPLC to run the separate tests for sugars and acids.

McFeeters devised his time-saving method against the advice of the HPLC manufacturer who said that it wouldn't work. He added one detector that finds acids by how they conduct electricity and another that measures alcohols and sugars by electrochemical detection. In this way, he was able to concurrently an-



A Further Step Toward Quality Assurance

alyze for both a sugar and an acid that the HPLC column couldn't separate.

He found the same technique could also be modified slightly to detect and measure sulfites in wine. Added to crushed grapes, sulfites ensure a quality wine by killing wild yeasts that can produce poor flavor. Unfortunately, research 20 years ago showed that even at low concentrations, sulfites can trigger a potentially fatal allergic-like reaction in people with asthma.

With the new HPLC technique McFeeters developed, sulfites can be detected at levels as low as 3 parts per million. That's the equivalent of a drop of water in a 10-gallon tank.

"Keep in mind, I found that most U.S. wines contain almost no sulfites," says McFeeters. "To test the HPLC, I had to spike American wines."

McFeeters ran the spiked wines and saw sulfites on the printout. To confirm, he treated the samples with a sulfite-destroying chemical and reran the test. The printouts showed no sulfite bump, confirming the technique's accuracy. That got McFeeters thinking.

"It seems possible that packers could use sulfites to preserve pickles in storage—then remove the sulfites with a food-safe chemical like peroxide when the pickles are ready to be packed and sold," says McFeeters. "It's an idea that flows from the wine, right back to pickles, my main research."—By **Jill Lee**, ARS.

This research is part of Crop Production, Product Value, and Safety, an ARS National Program described on the World Wide Web at <http://www.nps.ars.usda.gov/programs/cppvs.htm>.

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